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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/066,641	02/06/2002	Noureddine Bouadma	Q68381	4521

7590 01/30/2003

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EXAMINER

AL NAZER, LEITH A

ART UNIT	PAPER NUMBER
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2828

DATE MAILED: 01/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/066,641

Applicant(s)

BOUADMA, NOUREDDINE

Examiner

Leith A Al-Nazer

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

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Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4. 6) ☐ Other:

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
3. The drawings are objected to as failing to comply with 37 CFR 1.83(a) and 37 CFR 1.123 because they do not include word labels. The omission of word labels, such as “n-doped InP layer”, in figures 1, 2, 4, and 5 makes the figures harder to interpret. Applicant is encouraged to include word labels, such as those shown in U.S. Patent No. 6,261,855 to Suzuki.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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5. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 8 recite a “buried ribbon semiconductor laser structure.” The word “ribbon” is not a generic term in the art, and therefore, must be defined in independent claims 1 and 8.

Claim 2 recites the term “said layer” in the first line of step (g1). This term is vague and indefinite, and Examiner is unsure what layer is being referred to.

Claim 3 recites “forming a thin layer to protect the laser active layer.” However, the claim fails to provide the material composition of the thin layer, and also fails to provide any structural relationships between the “thin layer” and the other layers in the system.

Claim 6 recites “epitaxially growing a p-doped contact layer”. However, no structural relationships between this p-doped contact layer and the other layers is provided.

Claim 7 recites the term “lateral outside portions of p-doped layers”. This term is vague and indefinite, and Examiner is unsure what is meant by “lateral outside portions”.

6. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: Independent claims 1 and 8 fail to provide end reflecting elements (such as mirrors) to properly conform the laser cavity. Furthermore, claim 8 recites a ribbon surrounded by an n-doped layer, but the claim fails to recite any other of the essential structural elements as shown in figures 1, 2, 4, and 5.

7. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: Claims 1 recites a forming a p-doped confinement layer; forming a thin n-doped layer; and forming an active layer. However, the claim fails to provide any of the structural relationships between the three layers. For example, which layer is on top, which is on the bottom, and which is in between?

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 1, 2, and 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mersali et al '768 in view of Mori et al '479.

With respect to claim 1, Mersali teaches forming a p-doped confinement layer (12) on top of a III-V material substrate (10); forming a thin n-doped layer (13; column 3, lines 20-22); forming an active layer (14); and locally etching the active layer, the thin n-doped layer, and a portion of the thickness of the p-doped confinement layer to form a mesa including the ribbon (column 4, lines 30-38). Claim 1 requires burying the ribbon in an n-doped layer, rather than a p-doped layer as taught by Mersali. Mori teaches burying a ribbon in an n-doped layer (10 in figure 1). Mersali and Mori are analogous art because they are from a similar problem solving area: buried laser structures. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the n-doped burying layer of Mori with the system as taught or suggested by Mersali. The motivation for doing so would have been to provide a material for confining current to the active layer. Therefore, it would have been obvious to combine Mori with Mersali to obtain the invention as specified in claim 1.

With respect to claim 2, Mersali teaches etching to reduce layer width (column 4, lines 30-39), and masking the top surface of the burying layer of reduced width and depositing a dielectric material insulative layer (17A and 17B in figure 1).

With respect to claims 4 and 5, Mersali teaches a metallization layer (20 in figure 1) on top of the confinement layer.

With respect to claims 6 and 7, Mori teaches an epitaxially grown p-doped contact layer (8 in figure 1). Claim 6 further requires overturning the wafer onto a second wafer and eliminating the substrate, and depositing a metallization layer on top of the contact layer. Mori

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teaches overturning the wafer onto a second wafer (figure 1) and depositing a metallization layer (12) on top of the contact layer.

11. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mersali et al '768 in view of Mori et al '479 as applied to claims 1, 2, and 4-7 above, and further in view of Kakimoto '741.

Claim 3 requires forming a thin layer to protect the laser active layer. Kakimoto teaches such a configuration (1 in figure 1). Kakimoto and Mersali are analogous art because they are from a similar problem solving area: buried laser structures. Therefore, at the time of the invention, it would have been obvious to one having ordinary skill in the art to combine the thin protective layer of Kakimoto with the system as taught by Mersali.

12. Claims 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mersali et al '768 in view of Kakimoto '741.

With respect to claim 8, Mersali teaches a buried ribbon laser including a ribbon (14 in figure 1) forming part of a buried mesa, and the ribbon having four lateral faces, wherein the bottom surface of the ribbon is adjacent an n-doped layer. Claim 8 requires the top face of the ribbon also be adjacent to an n-doped layer. Kakimoto teaches such a configuration (1 in figure 1). Kakimoto and Mersali are analogous art because they are from a similar problem solving area: buried laser structures. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the n-doped layer above the ribbon as taught by Kakimoto with the system as taught or suggested by Mersali. The motivation for doing so would have been

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to provide a material for confining current to the active layer. Therefore, it would have been obvious to combine Kakimoto with Mersali to obtain the invention as specified in claim 8.

With respect to claim 9, Mersali teaches the lateral faces joining the top and bottom faces being adjacent an n-doped layer (1 and 7).

With respect to claim 10, Mersali teaches an n-doped layer less than 1 μm thick separating the ribbon from a p-doped layer (column 3, line 66 – column 4, line 12).

With respect to claims 11 and 12, Mersali teaches portions (17A and 17B) perpendicular to the planes of the top and bottom faces of the ribbon of a dielectric material layer on either side of the mesa.

Communication Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leith A Al-Nazer whose telephone number is 703-305-2717. The examiner can normally be reached on Monday-Friday 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on 703-308-3098. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7724 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-3329.


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January 17, 2003